

CLAIMS

1. An apparatus for painting animals and/or objects, using a coating paint product, characterized in that it has:
 - 5 • at least one column-like upright member
 - at least one spray nozzle fitted on said column
 - at least one tank containing said paint liquid
 - an electrically insulated, shower tray-like 10 platform
 - at least a jet-containing wall, which is likely to be situated in front of said column-like upright member.
- 15 2. Apparatus for painting animals and/or objects with a coating paint product as claimed in claim 1, characterized in that said product is vaporized and/or micronized and/or atomized by said spray nozzle placed on at least one column-like member, inside the booth.
- 20 3. Apparatus as claimed in one or more of the preceding claims, characterized in that said nozzles are in a number of two or more.
- 25 4. Apparatus as claimed in one or more of the preceding claims, characterized in that said nozzles are preferably in a number of three to five.
- 30 5. Apparatus as claimed in one or more of the preceding claims, characterized in that said nozzles are high-pressure pneumatic atomizers.
- 35 6. Apparatus as claimed in one or more of the preceding claims, characterized in that said walls may be in a number of two or more enclosing completely or partially a user housing volume, while the nozzles are oriented essentially in the direction of a central zone of the said volume or a central column coaxial to the

said volume.

7. Apparatus as claimed in one or more of the preceding claims, characterized in that said walls are curved about a vertical axis perpendicular to the booth 5 base.

8. Apparatus as claimed in one or more of the preceding claims, characterized in that said walls are concave toward the inside of the booth.

9. Apparatus as claimed in one or more of the 10 preceding claims, characterized in that said walls are preferably transparent.

10. Apparatus as claimed in one or more of the preceding claims, characterized in that said platform rotates in a clockwise and/or counter-clockwise 15 direction.

11. Apparatus as claimed in one or more of the preceding claims, characterized in that said platform is driven by a pneumatic motor.

12. Apparatus as claimed in one or more of the 20 preceding claims, characterized in that said platform is electrically shielded by a connection to the ground potential.

13. Apparatus as claimed in one or more of the preceding claims, characterized in that said platform 25 has the shape of a tray.

14. Apparatus as claimed in one or more of the preceding claims, characterized in that the paint product in use may be a tanning liquid and/or sea water and/or thermal spring water and/or thermal muds.

30 15. Apparatus as claimed in one or more of the preceding claims, characterized in that the paint product in use is sprayed in amounts of 1 ml to 200 ml.

16. Apparatus as claimed in one or more of the

preceding claims, characterized in that the paint product in use is sprayed in the preferred amount of 80 ml.

17. Apparatus as claimed in one or more of the preceding claims, characterized in that the paint product in use may be electrostatically charged.

18. Apparatus as claimed in one or more of the preceding claims, characterized in that said liquid is charged electrostatically inside the tank/s that contain the liquid.

19. Apparatus as claimed in one or more of the preceding claims, characterized in that an electrode and/or a sparking plug and/or a polarizing diode are associated to said tank and dip in said liquid or are in electric contact with the liquid.

20. Apparatus as claimed in one or more of the preceding claims, characterized in that said liquid is charged electrostatically while it passes through the pipe that connects the tank and the discharge nozzle/s.

21. Apparatus as claimed in one or more of the preceding claims, characterized in that the liquid is charged by radiative ionization.

22. Apparatus as claimed in one or more of the preceding claims, characterized in that the liquid is charged electrostatically while it passes through a transparent tube for connection of the tank and the spray nozzle/s, which transparent tube is adjacent to a UV lamp.

23. Apparatus as claimed in claims 1 to 17, characterized in that the liquid is atomized at the spray nozzles to liquid particles having an average diameter of about 20 μm .

24. Apparatus as claimed in claim 23,

characterized in that the liquid is charged electrostatically with a positive charge as an effect of the previous atomization.

25. Apparatus as claimed in one or more of the 5 preceding claims, characterized in that it includes a tubular inverted U-shaped upright 2 having nozzles in at least one of its stems.

26. Apparatus as claimed in one or more of the preceding claims, characterized in that it includes a 10 tubular inverted U-shaped upright 2 providing the function of supporting the curvilinear walls.

27. Apparatus according to one or more of the preceding claims characterized in that it comprises a tray-like platform (3) and a plurality of nozzles (5) 15 which are placed at different heights above the platform and at different angular positions on an ideal surface enveloping a volume vertically aligned with the said platform (3), the nozzles being fed with a treatment liquid under pressure, the liquid being 20 subjected to ionization or electrostatic charging before being fed to the nozzles and/or at the nozzles and/or immediately after leaving the nozzles by means of subjecting the liquid to the action of electric, magnetic, electromagnetic and/or mechanic energy.

28. Apparatus according to claim 27, characterized 25 in that the nozzles (5) are distributed on a rotational symmetric enveloping surface around a central vertical axis of the platform (3).

29. Apparatus according to claim 27 or 28, 30 characterized in that several vertical rows of nozzles are provided which are aligned along vertical axis at different positions on the ideal enveloping surface.

30. Apparatus according to one or more of the

preceding claims 27 to 29, characterized in that the nozzles (5) are positioned on each row in a non uniform way, the nozzles (5) of a row at a certain height being positioned closer than the nozzles (5) at different height along the row.

31. Apparatus according to one or more of the preceding claims 27 to 30 characterized in that the nozzles (5) are positioned on the enveloping surface vertically displaced the one with respect to the laterally adjacent forming spraying cones only slightly overlapping each other or not overlapping at all which cones are positioned in quinconce relationship.

32. Apparatus according to claim 31, characterized in that each row of nozzles (5) is vertically displaced with respect to the nozzles of the laterally adjacent row the cones of one row being placed in a quinconce relationship relatively to the cones of the laterally adjacent row.

33. Apparatus according to one or more of the preceding claims 27 a 32, characterized in that the enveloping ideal surface is a rectangular or elliptic surface or a polygonal surface being coaxial or concentric to a corresponding rectangular or elliptic or polygonal surface approximating the shape of the external surface of an upstanding body placed at the central zone of the platform (3).

34. Apparatus according to one or more of the preceding claims 27 to 33, characterized in that lateral walls (1) are provided departing vertically from the platform (3) and extending along the ideal enveloping surface.

35. Apparatus according to one or more of the preceding claims 27 to 34, characterized in that the

nozzles (5) are carried by the said walls (1).

36. Apparatus according to one or more of the preceding claims 27 to 34, characterized in that feeding pipes (102) are provided connecting each nozzle 5 (5) with a feeding circuit (90) for the liquid to be sprayed, the feeding pipes (102) supporting the nozzles (5) and being housed with the nozzles (5) in a hollow space between an internal layer (201) and an external layer (101) forming the lateral wall (1).

10 37. Apparatus according to claims 35 or 36, characterized in that vertical or upright feeding pipes (102) are provided for each row of nozzles (5), each vertical pipe (102) carrying the nozzles (5) of each vertical row and forming a liquid distributing chamber.

15 38. Apparatus according to claim 37, characterized in that the vertical or upright pipes (102) are distributed at different angular positions along the enveloping surface and are provided into two groups, the vertical pipes (102) of one group being provided on 20 one side of the enveloping surface and the second group on the opposite side of the said enveloping surface relatively to a central or diametric section plane of the said enveloping surface along the larger diameter or the larger center line.

25 39. Apparatus according to claim 38, characterized in that the vertical or upright pipes (102) are placed in a symmetric way with respect to the said central or diametric section plane of the said enveloping surface along the larger diameter or the larger center line.

30 40. Apparatus according to one or more of the preceding claims characterized in that at least a certain number of a second kind of nozzles is provided for spraying a different gas or liquid at least a

further feeding circuit being provided for the said other liquid or gas.

41. Apparatus according to claim 40, characterized in that the other liquid is water.

5 42. Apparatus according to claim 40, characterized the other fluid is air.

43. Apparatus according to one or more of the preceding claims characterized in that the platform (3) is shaped basin like and has a concave bottom degrading 10 towards an output opening, the said output opening being connected to a collecting tank a pump (43) being provided for feeding the rest liquid accumulated in the platform (3) after spraying from the said platform (3) to the said tank (41).

15 44. Apparatus according to one or more of the preceding claims, characterized in that vent or air suction means (42) are provided sucking the air from the volume enclosed by the lateral wall (1) and feeding the said air to a liquid condenser, the said condenser 20 having an output connected to the tank (41) directly or by means of a suction pump (40).

45. Apparatus according to one or more of the preceding claims characterized in that the tank for the liquid to be sprayed is formed by the bottles (80) in 25 which the liquid is sold or delivered which tanks are provided with an output sleeve (280), a closure cap (81) of the said bottle (80) being provided having mechanical clamping means (181) engaging the said output sleeve (280) and sealing means (82) for 30 sealingly connecting the closure cap (81) and the output sleeve (280), which clamping means can be disengaged from the output sleeve (280) and which closure cap (81) carries a suction tube (83) sealingly

passing through the said closure cap and reaching almost to the bottom of the bottle (80), the said suction tube (83) being connected to the feeding circuit of the liquid to the nozzles (5).

5 46. Apparatus according to claim 45, characterized in that the closure cap (81) carries a liquid level measuring or sensing means (84, 85).

10 47. Apparatus according to claims 45 or 46, characterized in that the collecting tank (41) is formed by an empty liquid bottle (80) a closure cap (81) being provided the suction tube (83) of which is connected at the rest liquid discharging circuit or pump and a maximum level sensing means (85) being provided on the said closure cap (81).

15 48. Apparatus according to one or more of the preceding claims, characterized in that a certain number of nozzles aligned on at least one plane parallel to the platform (3) is carried by a bracket (60), the said bracket (60) being carried in a vertical 20 slideable way on at least one vertical guide and actuator means being provided for displacing the said bracket up and down along the vertical guides, the bracket being formed by an open annular element which shape is correspondent to the enveloping surface.

25 49. Apparatus according to claim 48, characterized in that the bracket (60) is housed in the hollow space between the internal layer (201) and the external layer (101) forming the lateral wall (1), the said hollow space having a concentric or coaxial spare with respect 30 to the shape of the bracket (60), while the internal layer (201) of the lateral wall (1) has vertical openings coinciding with the vertical path of each nozzle (5) on the bracket (60).

50. Apparatus according to claim 49, characterized in that the nozzles (5) on the bracket forms blade like spraying jets.

51. Apparatus according to one or more of the preceding claims characterized in that the nozzles (5) are of the kind mixing the liquid to be sprayed with gas or air under pressure for atomization of the said liquid separate feeding circuits (66, 67) being provided for the gas or air under pressure and for the liquid.

52. Apparatus according to claim 51, characterized in that the gas and the air feeding circuits (66, 67) are provided with valves for closing alternatively one or both of the said feeding circuits, thereby causing the nozzles (5) to eject only liquid or only gas.

53. Apparatus according to one or more of the preceding claims 48 to 52, characterized in that further nozzles for a further different gas or liquid are provided which are connected to a dedicated feeding circuit.

54. Apparatus according to one or more of the preceding claims, characterized in that the nozzles (5) are connected to a circulating circuit having a feeding branch (90) of the liquid and a return branch (91) of the liquid. The feeding branch being connected to a first circulating pump (92), the feeding branch being connected to the feeding output of the pump (92), the return branch (91) being connected to the suction of the pump (92), in the return branch (91) being provided a device (93) for ionizing the liquid and a valve (94) for closing the return branch (91), the suction of the pump (92) being further connected to a liquid tank (80), the pump (92) being capable of generating a

variable liquid pressure within the circulating circuit, control means being provided for driving the pump at a range for generating a high pressure in the liquid and closing the return branch (91) by means of 5 the valve (94) and for driving the pump at a range generating low pressure in the liquid and activating the ioniser (93) and opening the valve (94) of the return branch (91).

55. Apparatus according to claim 54, characterized 10 in that two pumps are provided a first pump (92) being a low pressure pump and being activated for feeding the liquid from the tank (80) to the circuit and circulating the said liquid within the feeding and the return branch (90, 91) while the valve (94) in the 15 return branch (91) is open and the ioniser is activated and a second pump (95) for generating a high pressure at least in the feeding branch (90), which second high pressure pump (95) is provided in the feeding branch after the low pressure pump (92) and is 20 activated for generating the spraying pressure when the valve (94) on the return branch is closed, the second pump having a by-pass branch or being open for the liquid flow when inactive.

56. Apparatus according to claim 55, characterized 25 in that the low pressure pump (92) is a self triggering pump controlled by the liquid level sensor within the tank (80).

57. Apparatus according to claim 55 or 56, characterized in that the second pump is driven by a 30 brushless motor by means of an inverter (97) controlled by a CPU unit (98), the said pump being able to be driven at different rotation speeds for generating different values of the liquid pressure.

58. Apparatus according to one or more of the preceding claims 55 to 57, characterized in that the cpu controls the valves (94) in the return branch (91) which is an electrovalve and the ioniser and has 5 timing means counting time periods.

59. Apparatus according to one or more of the preceding claims, characterized in that a program is provided for driving the low pressure pump (92) together with the ioniser for a given period of time 10 and for activating the high pressure pump (95) at different rotational speeds corresponding to at least two different liquid pressures, and closing or opening the valve (94) in the return branch (91), the said program providing different operational phases:

15 a first circuit loading phase consisting in activating the low pressure pump (92) for sucking the liquid from the tank (80) into the feeding branch (90) and for opening the valve (94) in the return branch (91);

20 a second stand-by phase in which low pressure pump (92) is activated for providing circulation of the liquid through the ionization means (93) which are activated, the said phase being carried out for a period of time sufficient long for ensuring continuous 25 mixing and ionization of a certain amount of the liquid;

30 a third ready to start phase during which the high pressure pump is activated at a low level rotation speed so that the pressure does not increase as high as to open generate a liquid output at the nozzles but the pressure in the system reaches a higher pressure from which the optimum spraying pressure can be rapidly reached;

a fourth spraying phase in which the high pressure pump is brought to a higher rotation rate such as to allow the optimum spraying pressure to be reached and the electro valve in the return branch (91) is closed.

5 60. Apparatus according to one or more of the preceding claims, characterized in that manual means are provided for starting the spraying phase when the circuit is in a ready to start phase.

10 61. Apparatus according to one or more of the preceding claims characterized in that pressure sensitive nozzle-valves are provided which open the connection of the nozzles (5) to the feeding circuit only when the liquid in the feeding circuit reaches a certain pressure.

15 62. Apparatus according to claim 61, characterized in that each nozzle is provided at a peripheral wall of a feeding chamber (205), the said feeding chamber being connected to the feeding branch (90) by means of a pressure sensitive valve (305, 405, 505).

20 63. Apparatus according to claim 62, characterized in that the pressure sensitive valve being formed by a piston like shutter (505) slidably displaceable within the feeding chamber (205) from a position in which it closes the input opening (305) of the feeding chamber 25 in a position at which the said input opening (305) is not closed, elastic means being provided urging the said piston like shutter in the position closing the input opening (305).

30 64. Apparatus according to claim 63, characterized in that the said feeding chamber (205) and the pressure sensitive valve (305, 405, 505) housed therewith are integrated in a nozzle body, each nozzle (5) being provided with its own pressure sensitive valve.

65. Apparatus according one or more of the preceding claims 59 to 64, characterized in that during the ready to start phase the liquid pressure in the feeding branch (90) is lower than the pressure needed to open the pressure sensitive valves of the nozzles (5), while during the spraying phase the pressure of the liquid is higher than the pressure needed to open the pressure sensitive valves of the nozzles (5).

66. Apparatus according to one or more of the preceding claims, characterized in that at least part of the pump or pumps and/or of the valves and/or of the driving units and/or of the pipes forming the feeding and/or return branches (90, 91) and/or of the tanks (80, 40), and/or of the control units is housed on a trolley like member which is housed in a lateral extension room of a booth formed by the lateral wall (1) and the platform (3), the said lateral extension room being provided with a door and the said trolley being displaceable inside and outside the said extension room, while flexible pipe and or cable connections are provided to the circuit parts and/or to the electric connection cables residently and fixedly mounted on the lateral wall (1) and or on the platform (3).

67. Apparatus according to one or more of the preceding claims characterized in that the high pressure pump is drive in order to reach a spraying pressure from 30 to 100 bars, preferably from 60 to 70 bar.

68. Apparatus according to one or more of the preceding claims characterized in that Each spraying cycle lasts several seconds particularly from 1 to 3 seconds.

69. Apparatus according to one or more of the preceding claims, characterized in that between two spraying cycles a rest cycle of predetermined duration is provided which is sufficient for a certain amount of 5 the vaporized or atomized liquid particles in the air to fall down by gravity

70. Apparatus according to one or more of the preceding claims, characterized in that the nozzles and the pressure of the liquid are defined in such a way as 10 to generate drops having a range between 5 and 40 microns and to avoid turbulences.

71. Apparatus according to one or more of the preceding claims characterized in that it is an apparatus for spraying tanning liquid on a human body.

72. Apparatus for painting animals and/or objects, using a coating paint product and/or a tanning liquid, characterized in that it is a portable apparatus being formed by a spraying gun comprising an electric pump integrated in a handle and having means for securing 20 the said gun to a liquid tank the said gun having a suction sleeve housed in said tank and a spraying nozzle (5) at the pump output, the said spraying gun having an activation button integrated in the handle.

73. Apparatus according to claim 72, characterized 25 in that it is provided with one or more stencils (11) having different patterns or designs.

74. Apparatus according to claims 72 or 73, characterized in that several nozzles (5) of different kind are provided which can be mounted on the spraying 30 gun.

75. Apparatus according to one or more of the preceding claims 72 to 74, characterized in that it is an apparatus for spraying a paint or tanning liquid or

similar liquids on a local zone of a human body.

76 Apparatus according to one or more of the preceding claims 72 to 75, characterized in that it is a kit for providing a human body with a tattoo like pattern.

77. A method for painting animals and/or objects, using a coating paint product or similar, characterized by the following steps:

10 atomizing a electrically charged or ionized painting or tanning liquid or similar and spraying the said atomized or vaporized liquid against a body;

15 the liquid being electrically charged or ionized before being fed on directly at the nozzles;

20 the energy field; for electrically charging or ionizing the liquid being confined to the liquid feeding and /or spraying circuit so that the body is outside the said field.

25 78. A method according to claim 77, characterized in that the energy field consist in an electric field and/or a magnetic field and/or an electromagnetic field.

30 79. A method according to claim 77, characterized in that the liquid is electrically charged or ionized by mechanical energy.

80. A method according to claim 7, characterized in that the liquid is electrically charged and/or ionized by reducing the droplets size of the vaporized or atomized liquid to a size where electrostatic charge inhomogenities of the molecular structure of the liquid becomes relevant.

81. A method according to one or more of the preceding claims characterized in that the liquid is atomized or vaporized to a droplet size from 5 to 40

microns.

82. A method according to one or more of the preceding claims 77 to 81, characterized in that spraying of the liquid is carried out from several 5 directions against the body to be treated and at several height of the said body by providing several spray jets distributed over a body enveloping surface at different heights thereof.

83 A method according to one or more of the 10 preceding claims characterized in that the sprayed jets are oriented in such a way one with respect to the other that at a certain distance the spraying cones generated do only slightly overlap or do not overlap at all.

15 84. A method according to claim 83, characterized in that the sprayed jets are oriented in such a way as to generate sprayed areas on the body to be treated which have a quinconce arrangement.

20 85. a method according to one or more of the preceding claims 77 to 84, characterized in that spraying jets are provided closer to one another at certain zones of the body to be treated.

25 86. A method according to one or more of the preceding claims 77 to 85, characterized in that each sprayed jet is originated approximately from the same distance from the corresponding target zone of the body to be treated.

30 87. A method according to one or more of the preceding claims 77 to 86, characterized in that groups of spray jets are generated, the jest of each group being positioned on the enveloping surface on a vertical row of jets and the different vertical row of jets being distributed at different angular positions

along an enveloping surface of the body to be treated.

88. A method according to one or more of the preceding claims 77 to 87, characterized in that the enveloping ideal surface is a rectangular or elliptic 5 surface or a polygonal surface being coaxial or concentric to a corresponding rectangular or elliptic or polygonal surface approximating the shape of the external surface of an upstanding body.

89. A method according to one or more of the preceding claims 77 to 88, characterized in that a plurality of spray jets is generated along a line on the enveloping surface, the said jets being displaced along the axial dimension of the enveloping surface in both directions.

90. A method according to claim 89, characterized in that the speed of displacement is different at different parts of the path of the jets.

91. A method according to one or more of the preceding claims 77 to 90, characterized in that the spray jets are generated by providing the liquid under high pressure conditions and feeding the said high pressure liquid to one or more spray nozzles (5), the spray nozzles (5) being open to input of the high pressure liquid only starting for a certain liquid 25 pressure.

92. A method according to one or more of the preceding claims, characterized in that one or more stencils are provided for cooperating with one or more spray jets.

93. A method for locally spraying a paint or tanning liquid on a body, characterized in that a single spray jet of painting or tanning liquid is generated which has an aperture cone for treating only

a local zone of the body and one or more corresponding stencils are provided.

94. a method according to one or more of the preceding claims 77 to 93, characterized in that it is
5 a method for spraying paint or tanning liquid onto a human body.

95. A method according to one or more of the preceding claims 77 to 93 characterized in that it is a method for providing a human body with a tattoo or a
10 tattoo like pattern.